

## ELK MOUND FACT SHEET

GENERAL INFORMATION	
<b>Permit Number:</b> WI-0023914-09	<b>FID:</b> 617006500
<b>Permittee:</b> Village of Elk Mound, Box 188, Elk Mound, WI 54739	
<b>Discharge Location:</b> Elk Mound Wastewater Treatment Facility, S210 Holly Avenue, Elk Mound, WI 54739 (NE ¼ of NE ¼ of Section 34, T28N, R11W – Outfall: 44.87015° N/ Lon: 91.69341° W)	
<b>Receiving Waters:</b> the surface waters of a wetland tributary to Muddy Creek in the Muddy and Elk Creeks Watershed in the Lower Chippewa River Basin located in Dunn County.	
<b>Stream Classification:</b> Limited Forage Fish, Non-public Water Supply	
<b>Discharge Type:</b> Existing, Continuous	<b>Q<sub>(7,10)</sub>:</b> 0 cfs
<b>Annual Average Design Flow:</b> 0.192 MGD (2017)	<b>Permit Application Waivers:</b> None
Sample Points/Outfalls	
<b>Sample Point 701, Influent</b>	Influent to plant from Elk Mound
<b>Outfall 002, Effluent</b>	Treated effluent is discharged to surface water (actual annual average flow 0.099 MGD in 2017)
<b>Outfall 003, Municipal Sludge</b>	Landspreading of municipal sludge (15 dry metric tons in 2017)

## FACILITY DESCRIPTION

<p><b>Facility Description:</b> The Elk Mound Wastewater Treatment Facility treats domestic wastewater from the Village of Elk Mound. The annual average design flow is 0.192 million gallons per day (MGD), and had an actual annual average flow of 0.099 MGD in 2017. Raw wastewater is directed into an oxidation ditch consisting of two channels providing secondary treatment. From the ditch wastewater flows to a secondary clarifier and through a UV disinfection chamber (not in use) and ultimately flows over a cascade aerator into the adjacent wetland that is tributary to Muddy Creek. Stored sludge is landspread on Department approved agricultural fields. During periods of extremely high flow, excess wastewater can be pumped from the main pump station at the head of the plant into a 0.665 million-gallon storage tank. As flow recedes this wastewater is fed back into the system for treatment. No significant operational changes occurred during the last permit term. Significant effluent monitoring and/or limit changes proposed for the upcoming permit term are as follows: 1) the addition of an interim effluent phosphorus limit, a reduction in the phosphorus limit in the next permit term and inclusion of a compliance schedule to meet those lower limits, 2) addition of zinc limits and an associated compliance schedule, 3) the addition of acute WET testing, and 4) update of a copper compliance schedule related to the proposed variance (pending review and approval by EPA after public informational hearing and public comment period).</p>	
<p><b>Publishing Newspaper:</b> Leader Telegram, PO Box 570, Eau Claire, WI 54701 See associated public notice document for additional contact and procedural information</p>	
<p><b>Significant Industrial Loading?</b> No</p>	

### SUBSTANTIAL COMPLIANCE DETERMINATION - OVERALL

	Compliance	Comments
Discharge Limits	Yes	
Sampling/testing requirements	Yes	
Groundwater standards	N/A	
Reporting requirements	Yes	
Compliance schedules	Yes	
Other:	None	
Operator at proper grade?	Yes	
Enforcement considerations	None	
In substantial compliance? Yes	Concurrence: Ben Hartenbower	Date: 03/18/2018

### SUBSTANTIAL COMPLIANCE DETERMINATION – LAND APP

	Compliance	Comments
Discharge Limits	Yes	
Sampling/testing requirements	Yes	
Groundwater standards	n/a	
Reporting requirements	Yes	
Compliance schedules	n/a	
Other:	n/a	
Enforcement considerations	None	
In substantial compliance? Yes	Name: Leanne Hinke	Date: 07/02/18

### INFLUENT MONITORING

Sample Point: 701	Sample Description: Representative influent samples shall be collected after the raw sewage pumps		
PARAMETER	LIMITATION	SAMPLE FREQ	SAMPLE TYPE
BOD <sub>5</sub> , Total	mg/L	3/Week	24 Hr Fl Prop Comp
Total Suspended Solids	mg/L	3/Week	24 Hr Fl Prop Comp
Copper, Total Recoverable <sup>1</sup>	µg/L	Quarterly	24 Hr Fl Prop Comp
<sup>1</sup> The quarterly influent samples for copper shall be collected at the same time as copper effluent samples.			
Explanation of changes from last permit: None			

## EFFLUENT MONITORING / LIMITATIONS

<b>Outfall Location:</b> NE ¼, NE ¼, Section 34, T28N R11W, Town of Elk Mound, Dunn County, WI The outfall is located by the security fence on the east side of the facility.			
<b>Outfall No:</b> 002	<b>Sample Description:</b> Representative composite effluent samples shall be collected from the final clarifier and grab samples shall be collected from the effluent discharge cascade channel.		
PARAMETER	LIMITATION	SAMPLE FREQ	SAMPLE TYPE
Flow Rate	MGD	Continuous	
BOD <sub>5</sub> , Total	15 mg/L Monthly Avg, 30 mg/L Daily Max	3X/Week	24 Hr FI Prop Comp
Total Suspended Solids	20 mg/L Monthly Avg, 30 mg/L Daily Max	3X/Week	24 Hr FI Prop Comp
pH, Field	9.0 su Daily Max, 6.0 su Daily Min	Daily	Grab
Dissolved Oxygen	4.0 mg/L Daily Min	Daily	Grab
Nitrogen, Ammonia (NH <sub>3</sub> -N) Total, Oct-March	31 mg/L Weekly Avg, 12 mg/L Monthly Avg	3X/Week	24 Hr FI Prop Comp
Nitrogen, Ammonia (NH <sub>3</sub> -N) Total, April-May	8.1 mg/L Weekly Avg, 3.2 mg/L Monthly Avg	3X/Week	24 Hr FI Prop Comp
Nitrogen, Ammonia (NH <sub>3</sub> -N) Total, June-Sept	5.6 mg/L Weekly Avg, 2.2 mg/L Monthly Avg	3X/Week	24 Hr FI Prop Comp
Copper, Total Recoverable <sup>1</sup>	34 µg/L Daily Max Variance Limit, 24 µg/L Weekly Avg Variance Limit	2/Month	24 Hr FI Prop Comp
Zinc, Total Recoverable <sup>2</sup>	120 µg/L & 0.51 lbs/day Daily Max, 120 µg/L Weekly Avg, 120 µg/L Monthly Avg	Monthly	24 Hr FI Prop Comp
Phosphorus, Total (Interim limit) <sup>3</sup>	7.7 mg/L Monthly Avg	3X/Week	24 Hr FI Prop Comp
Phosphorus, Total (Final limit, effective next permit term) <sup>3</sup>	0.075 mg/L & 0.12 lbs/day 6-Month Ave and 0.225 mg/L Monthly Ave	3X/Week	24 Hr FI Prop Comp
Acute WET <sup>4</sup>	TU <sub>a</sub>	Twice	24 Hr FI Prop Comp

<sup>1</sup> Copper samples shall be collected twice in one week of each month. Elk Mound has applied for a continuation of a copper variance which included the submittal of a copper source reduction measures plan as required by s. 283.15(5)(c)2, Wis. Stats. In the absence of a copper variance the water quality based effluent limits for copper would be 16 ug/L (0.066 lbs/day) as a daily maximum, 10 ug/L (0.017 lbs/day) as a weekly average and 10 ug/L as a monthly average.

<sup>2</sup> Zinc monitoring is required at permit effective date. Zinc limits become effective July 1, 2022 per the associated compliance schedule.

<sup>3</sup> The interim phosphorus limit is effective throughout the permit term. The final limits become effective during the next permit term and have an associated compliance schedule. See the phosphorus section below and Schedules of Compliance Section for more information.

<sup>4</sup> Acute WET testing is required in the following quarters: 1st quarter (Jan-March) 2021 and 3rd quarter (July-Sept) 2023

**Explanation of Limits & Monitoring:** Limits were determined for the Village of Elk Mound's existing discharge to the wetland using chs. NR 102, 104, 105, 106, 205, 210 and 217 of the Wisconsin Administrative Code (where applicable). The effluent limits for BOD<sub>5</sub>, TSS and pH are based on NR 210. For additional information see below and the September 13, 2017 limits memo from Pat Oldenburg to Holly Heldstab titled "Water Quality Based Effluent Limitations for the Elk Mound Municipal Water & Sewer Utility (WI-0023914)" for more information.

<p><b>Explanation of effluent changes from last permit:</b> 1) The continuation of a copper variance has been requested. See below for more information. 2) Addition of zinc limits, 3) Addition of a narrative interim phosphorus limit, a reduction in the phosphorus limit in the next permit term, and inclusion of an associated phosphorus compliance schedule to meet those limits, and 4) Addition of twice per year Acute WET Testing.</p>
<p><b>Ammonia:</b> Monitoring is required three times per week, and seasonal &amp; weekly average limitations apply throughout the permit term. The ammonia limitations are based on receiving water and default values for water chemistry. The discharge at Elk Mound enters a large wetland complex prior to reaching downstream surface waters.</p>
<p><b>Copper:</b> A variance has been tentatively approved for the copper limit. Effluent monitoring data for copper continues to show Elk Mound is unable to meet the water quality based effluent limitations (WQBELs) of 16 µg/L as a daily maximum and 10 µg/L for both the weekly and monthly averages. The relatively low hardness levels of the effluent and lack of receiving water dilution allowance for the water body result in this relatively strict effluent limitation. Treatment for copper at the treatment facility is not economically feasible.</p> <p>Source reduction is the chosen course of action to lower discharge levels. The only significant source of copper to the treatment system from this facility appears to be from dissolution of plumbing materials. Corrosion control of the public water supply should theoretically reduce copper levels coming into the treatment plant. However, it is unclear that treating the water supply at Elk Mound will reduce copper levels, particularly to a point sufficient to achieve WQBELs. Elk Mound will install a caustic soda dosing system into the water supply in an attempt to reduce copper loading to the wastewater treatment plant.</p> <p>There are no other economically feasible means of meeting the copper water quality based effluent limits, therefore the Department believes that the basis for a variance specified in s. 283.15(4) (a) 1. f. is satisfied. The Department has tentatively decided to grant a variance which will allow a limit of 34 µg/L as a daily maximum and 24 µg/L as a weekly average. The copper target value shall be 22 µg/L, a 10 percent reduction from the most stringent copper limit of 24 µg/L as a daily maximum. This value is a goal for reduction during the current permit term but is not an enforceable limit.</p>
<p><b>Zinc:</b> The 1-day P99 of the effluent zinc data exceeds the calculated daily maximum zinc limitation, therefore the following zinc limits are included in the permit, along with a compliance schedule to meet them by July 1, 2022: 120 µg/L and 0.51 lbs/day as a daily max, 120 µg/L weekly average and 120 µg/L monthly average.</p>
<p><b>Phosphorus:</b> See the limits memos referenced above for more details. Monitoring 3X/week is effective at the permit effective date. The interim monthly average phosphorus limit of 7.7 mg/L is effective throughout the permit term. As a result of changes to NR 217, progress must be made to achieve the calculated water quality based limits of 0.075 mg/L and 0.12 lbs/day (6-month averages) and 0.225 mg/L (monthly average) during the subsequent permit term. The permit contains a compliance schedule to meet the water quality-based effluent limits (WQBELs) for phosphorus in accordance with s. NR 217.17, Wis. Adm. Code.</p> <p>The proposed 6-month average concentration limit for phosphorus of 0.075 mg/L represents a very challenging level for wastewater facilities to meet with current technology and operation. Even with treatment optimization, facilities like Elk Mound that have an oxidation ditch and final clarification, the Department believes these processes are insufficient to meet either the proposed monthly or 6-month average limits. Therefore, the Department believes that a compliance schedule is necessary for Elk Mound to comply with the proposed limitations. It is also probable that, in order to consistently comply with the 0.075 mg/L limit, Elk Mound will need to evaluate and implement any number of the following approaches:</p> <ul style="list-style-type: none"> <li>--Plant optimization;</li> <li>--Phosphorus source reduction;</li> <li>--Additional treatment processes, or replacement or retrofitting of the current phosphorus removal process;</li> <li>--Potential for adaptive management and/or pollutant trading with upstream contributors, and implementation of such trades.</li> </ul>
<p><b>Temperature:</b> Chapters NR 102 and 106 include temperature criteria and related procedures for calculating water quality based effluent limitations for temperature. Since the discharge is initially to a wetland, thermal criteria are based on the narrative language in ch. NR 103.03 and s. NR 106.55(4). Based on the monitoring data</p>

submitted by the permittee no temperature limits or monitoring are required. The temperature data indicate that the current discharge will be protective of the wetland functional values. While the end-of-pipe temperatures exceeded the limited forage fish criteria during the month of November, the effluent will cool off considerably in the wetland and the discharge will not thermally impact the downstream limited forage fishery.

## DISINFECTION

**Is disinfection required for this discharge?** No, per ch. NR 210.06, Wis. Adm. Code. UV equipment is available, but not used at this time as the discharge is to a variance waterbody.

## BIOMONITORING REQUIREMENTS

<b>Is biomonitoring required at this outfall?</b> Yes, Acute WET testing is required in the following quarters: 1 <sup>st</sup> quarter (Jan-March) 2021 and 3 <sup>rd</sup> quarter (July-Sept) 2023	IWC= N/A	<b>Primary Control Water Location:</b> Muddy Creek
<b>Is biomonitoring required at this outfall?</b> Based on Chapter 1.3 of the Nov 1, 2016, <i>Whole Effluent Toxicity Program Guidance Document - Revision #11</i> , acute WET testing is required twice during the permit term. See the limits memos referenced above for more information.		
<b>If the stream class at the discharge point is other than Fish and Aquatic Life, how far down stream is the next Fish and Aquatic Life stream?</b> The receiving water is a wetland that is tributary to Muddy Creek; the wetland is a limited forage fish community. From the point of discharge to Muddy Creek is approximately 3 miles.		

## SLUDGE REQUIREMENTS

**All sludge management requirements were determined ch. NR 204, Wis. Adm. Code**

<b>Sample Description:</b> Representative composite sludge samples shall be collected from the outlet pipe of the sludge storage tank and monitored for Lists 1, 2, 3 and 4 annually and once for PCBs in 2020.					
Sludge # (3 digits)	Sludge Class (A or B)	Liquid or Cake	Pathogen Reduction Method	Vector Attraction Reduction Method	Reuse Option
003	B	Liquid	Aerobic Digestion & Alkaline Stabilization	pH Adjustment	Land Application
<b>Sludge Management Adequate?</b> Yes			<b>Sludge Storage Adequate?</b> Yes, 219 days provided onsite		
<b>Radium Requirements:</b> Is radium-226 present in the water supply at a level greater than 2 pCi/L? No					
<b>Is a priority pollutant scan required?</b> No					
<b>Quantity of sludge used/disposed of annually:</b> 16 metric tons (2017)					

## PROPOSED COMPLIANCE SCHEDULES

### Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus

Required Action	Due Date
<p><b>Operational Evaluation Report:</b> The permittee shall prepare and submit to the Department for approval an operational evaluation report. The report shall include an evaluation of collected effluent data, possible source reduction measures, operational improvements or other minor facility modifications that will optimize reductions in phosphorus discharges from the treatment plant during the period prior to complying with final phosphorus WQBELs and, where possible, enable compliance with final phosphorus WQBELs by March 31, 2022. The report shall provide a plan and schedule for implementation of the measures, improvements, and modifications as soon as possible, but not later than March 31, 2022 and state whether the measures, improvements, and modifications will enable compliance with final phosphorus WQBELs. Regardless of whether they are expected to result in compliance, the permittee shall implement the measures, improvements, and modifications in accordance with the plan and schedule specified in the operational evaluation report.</p> <p>If the operational evaluation report concludes that the facility can achieve final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the permittee shall comply with the final phosphorus WQBEL by March 31, 2022 and is not required to comply with the milestones identified below for years 3 through 7 of this compliance schedule ('Preliminary Compliance Alternatives Plan', 'Final Compliance Alternatives Plan', 'Final Plans and Specifications', 'Treatment Plant Upgrade to Meet WQBELs', 'Complete Construction', 'Achieve Compliance').</p> <p><b>STUDY OF FEASIBLE ALTERNATIVES</b> - If the Operational Evaluation Report concludes that the permittee cannot achieve final phosphorus WQBELs with source reduction measures, operational improvements and other minor facility modifications, the permittee shall initiate a study of feasible alternatives for meeting final phosphorus WQBELs and comply with the remaining required actions of this schedule of compliance. If the Department disagrees with the conclusion of the report, and determines that the permittee can achieve final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the Department may reopen and modify the permit to include an implementation schedule for achieving the final phosphorus WQBELs sooner than March 31, 2026.</p>	03/31/2020
<p><b>Compliance Alternatives, Source Reduction, Improvements and Modifications Status:</b> The permittee shall submit a 'Compliance Alternatives, Source Reduction, Operational Improvements and Minor Facility Modification' status report to the Department. The report shall provide an update on the permittee's: (1) progress implementing source reduction measures, operational improvements, and minor facility modifications to optimize reductions in phosphorus discharges and, to the extent that such measures, improvements, and modifications will not enable compliance with the WQBELs, (2) status evaluating feasible alternatives for meeting phosphorus WQBELs.</p>	03/31/2021
<p><b>Preliminary Compliance Alternatives Plan:</b> The permittee shall submit a preliminary compliance alternatives plan to the Department.</p> <p>If the plan concludes upgrading of the permittee's wastewater treatment facility is necessary to achieve final phosphorus WQBELs, the submittal shall include a preliminary engineering design report.</p> <p>If the plan concludes Adaptive Management will be used, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 without the Adaptive Management Plan.</p> <p>If water quality trading will be undertaken, the plan must state that trading will be pursued.</p>	03/31/2022
<p><b>Final Compliance Alternatives Plan:</b> The permittee shall submit a final compliance alternatives</p>	03/31/2023

<p>plan to the Department.</p> <p>If the plan concludes upgrading of the permittee's wastewater treatment is necessary to meet final phosphorus WQBELs, the submittal shall include a final engineering design report addressing the treatment plant upgrades, and a facility plan if required pursuant to ch. NR 110, Wis. Adm. Code.</p> <p>If the plan concludes Adaptive Management will be implemented, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 and an engineering report addressing any treatment system upgrades necessary to meet interim limits pursuant to s. NR 217.18, Wis. Adm. Code.</p> <p>If the plan concludes water quality trading will be used, the submittal shall identify potential trading partners.</p> <p>Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.</p>	
<p><b>Progress Report on Plans &amp; Specifications:</b> Submit progress report regarding the progress of preparing final plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.</p>	03/31/2024
<p><b>Final Plans and Specifications:</b> Unless the permit has been modified, revoked and reissued, or reissued to include Adaptive Management or Water Quality Trading measures or to include a revised schedule based on factors in s. NR 217.17, Wis. Adm. Code, the permittee shall submit final construction plans to the Department for approval pursuant to s. 281.41, Stats., specifying treatment plant upgrades that must be constructed to achieve compliance with final phosphorus WQBELs, and a schedule for completing construction of the upgrades by the complete construction date specified below. (Note: Permit modification, revocation and reissuance, and reissuance are subject to s. 283.53(2), Stats.)</p> <p>Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.</p>	03/31/2025
<p><b>Treatment Plant Upgrade to Meet WQBELs:</b> The permittee shall initiate construction of the upgrades. The permittee shall obtain approval of the final construction plans and schedule from the Department pursuant to s. 281.41, Stats. Upon approval of the final construction plans and schedule by the Department pursuant to s. 281.41, Stats., the permittee shall construct the treatment plant upgrades in accordance with the approved plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.</p>	06/30/2025
<p><b>Complete Construction:</b> The permittee shall complete construction of wastewater treatment system upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.</p>	02/28/2026
<p><b>Achieve Compliance:</b> The permittee shall achieve compliance with final phosphorus WQBELs. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.</p>	03/31/2026

**Explanation of Compliance Schedule:** Subsection NR 217.17, Wis. Adm. Code, allows the department to provide a schedule of compliance for water quality based phosphorus limits where the permittee cannot immediately achieve compliance. This compliance schedule requires the permittee to comply with the final water quality based phosphorus limits within 7 years.

## Zinc Compliance Schedule

Required Action	Due Date
<b>Report on Effluent Discharges:</b> Submit a report on effluent discharges of zinc with conclusions regarding compliance.	04/01/2020
<b>Action Plan:</b> Submit an action plan for complying with the effluent limitation. If construction is required, include plans and specifications with the submittal.	01/01/2021
<b>Initiate Actions:</b> Initiate actions identified in the plan.	01/01/2022
<b>Complete Actions:</b> Complete actions necessary to achieve compliance with the effluent limitations for zinc. The limitations become effective July 1, 2022.	07/01/2022

**Explanation of Compliance Schedule:** The compliance schedule for zinc provides a schedule for conducting the actions necessary to comply with the new limits. The compliance schedule lays out a time line for the permittee to investigate and implement a plan, including potential construction, to comply with the limits by the end of the schedule. See the section on zinc in the effluent limits and monitoring section above for more information on the need for the limits.

## Copper Source Reduction Measures

This schedule requires the permittee to comply with the following required actions related to discharge limits for copper.

Required Action	Due Date
<b>Implement Corrosion Control or Other Approved Plan:</b> The permittee shall implement the experimental and approved water supply corrosion control as approved by the Department or commence implementation of another approved plan of investigations.	10/01/2019
<p><b>Submit Annual Copper Report:</b> The permittee shall submit annual reports assessing the effectiveness of corrosion control or other plan of investigations.</p> <p>The report shall include a summary of monitoring results including trends in weekly, monthly and annual copper concentrations and total mass discharge of copper based on copper sampling and flow data; and</p> <p>Include an analysis of how influent and effluent copper varies with time and with the implementation of the corrosion control or other approved plan of investigation; and</p> <p>Include a report on the success of copper reductions efforts and describe any other options explored for meeting the water quality standards.</p> <p>The annual report shall be submitted by January 31st of each year and summarize the above information for the previous year.</p>	01/31/2020
<b>Submit Annual Report #2:</b> Submit second annual report as detailed above.	01/31/2021
<b>Submit Annual Report #3:</b> Submit third annual report as detailed above.	01/31/2022
<b>Submit Annual Report #4:</b> Submit fourth annual report as detailed above.	01/31/2023
<b>Final Copper Report #5:</b> Submit the final copper report documenting the success in meeting copper reductions, as well as the anticipated future reduction in copper sources and copper effluent concentrations. The report shall summarize copper source reduction measures that have been implemented during the current permit term and state which, if any, source reduction measures from the Source Reduction Plan were not pursued and why. The report shall include an analysis of trends in weekly, monthly, and annual average copper concentrations and total mass discharge of copper	01/31/2024



based on the copper sampling and flow data covering the current permit term. The report shall also include an analysis of how influent and effluent copper varies with time and implementation of the corrosion control or other approved plan of investigation.  Additionally, the report shall include proposed interim limits and source reduction measures for negotiations with the department if the permittee intends to seek a renewed copper variance for the reissued permit.	
<b>Submit Annual Reports After Permit Expiration:</b> In the event that this permit is not reissued on time, the permittee shall continue to submit annual Copper Reports by January 31 of each year summarizing the above information for the previous year.	

**Explanation of Compliance Schedule:** A variance from the copper limits has been applied for and (tentatively) approved. As a condition of that variance the permittee is required to investigate and reduce the sources of the metal.

### **Justification of Any Waivers from Permit Application Requirements**

None.

### **SPECIAL REPORTING REQUIREMENTS**

None

### **OTHER COMMENTS**

None

**Proposed expiration date:** March 31, 2024

**Prepared by:** Holly Heldstab & Phillip Spranger    **Date:** October 17, 2018

Attachments:

WQBEL Memos – March 19, 2013 and September 13, 2017

Facility Specific EPA Data Sheet

Public Notice

ecc: Benjamin Hartenbower

**CORRESPONDENCE / MEMORANDUM****State of Wisconsin**

DATE: March 19, 2013

TO: Holly Heldstab- WCR

FROM: Patrick Oldenburg - WCR

SUBJECT: Water Quality-Based Effluent Limitations for the Elk Mound Municipal Water and Sewer Utility (WI-0023914)

This is in response to your request for an evaluation of water quality-based effluent limitations for toxic substances using chs. NR 102, 105, 106, and 207 of the Wisconsin Administrative Code (where applicable), for the Elk Mound Municipal Water and Sewer Utility's discharge to a Wetland Tributary to Muddy Creek. The discharge is located in the Muddy and Elk Creek Watershed of the Lower Chippewa River Basin in Dunn County.

Based on our review, the following recommendations are made on a chemical-specific basis:

Parameter	Limit Type	Limit and Units	Notes
Flow Rate		MGD	1
BOD <sub>5</sub> , Total	Daily Max	30 mg/L	1
BOD <sub>5</sub> , Total	Monthly Avg	15 mg/L	1
Suspended Solids, Total	Daily Max	30 mg/L	1
Suspended Solids, Total	Monthly Avg	20 mg/L	1
pH Field	Daily Max	9.0 su	1
pH Field	Daily Min	6.0 su	1
Dissolved Oxygen	Daily Min	4.0 mg/L	1
Nitrogen, Ammonia (NH <sub>3</sub> -N) Total	Monthly Avg	12 mg/L	1,2
Nitrogen, Ammonia (NH <sub>3</sub> -N) Total	Weekly Avg	31 mg/L	1,2
Nitrogen, Ammonia (NH <sub>3</sub> -N) Total	Monthly Avg	3.2 mg/L	1,3
Nitrogen, Ammonia (NH <sub>3</sub> -N) Total	Weekly Avg	8.1 mg/L	1,3
Nitrogen, Ammonia (NH <sub>3</sub> -N) Total	Monthly Avg	2.2 mg/L	1,4
Nitrogen, Ammonia (NH <sub>3</sub> -N) Total	Weekly Avg	5.6 mg/L	1,4
Copper, Total Recoverable	Daily Max	31 µg/L; 0.13 lbs/day	
Copper, Total Recoverable	Weekly Avg	10 µg/L; 0.017 lbs/day	5
Zinc, Total Recoverable	Weekly Avg	120 µg/L; 0.19 lbs/day	6
Phosphorus, Total	Monthly Avg	0.225 mg/L	
Phosphorus, Total	6 Month Avg	0.075 mg/L	
Temperature, Maximum		°F	7

1. Continued from current permit.
2. Limit effective October – March.
3. Limit effective April – May.
4. Limit effective June – September.
5. The alternate wet weather weekly average limitation for copper is 0.041 lbs/day.
6. The alternate wet weather weekly average limitation for zinc is 0.48 lbs/day. Once additional sample results have been submitted the permittee may request a reevaluation of these limit recommendations.
7. 4th year of the permit term.

Zinc may be a water quality concern as the average effluent concentration exceeds 1/5 the weekly average effluent limit (single sample). The recommended weekly average limitation is 120 µg/L and 0.19 lbs/day. The mass limit is based on the concentration limit and the average design flow. The alternate wet weather weekly average mass limitation of 0.48 lbs/day is based on the reported peak weekly flow of 0.480 MGD. After the facility analyzes additional samples, either the 1-day P99 values or mean effluent concentration may allow these limits to be removed from the permit and decrease further testing requirements. Once additional sample results have been submitted the permittee may request a reevaluation of these limit recommendations.

Daily maximum copper limits are recommended at Elk Mound since the 1-day P99 value and the daily maximum reported concentration exceeds the calculated daily maximum limitation. The calculated daily maximum limitations are 31 µg/L and 0.13 lbs/day. The reduction in the daily maximum copper limit is primarily due to changes to copper criteria in ch. NR 105. The mass limitation is based on the concentration limit and the estimated maximum day design flow of 0.510 MGD. Weekly average copper limits are recommended at Elk Mound since the 4-day P99 value exceeds the calculated weekly average limitation. The calculated weekly average limitations are 10 µg/L and 0.017 lbs/day. The mass limitation is based on the concentration limit and the average design flow of 0.192 MGD. The alternate wet weather weekly average mass limitation of 0.041 lbs/day is based on the reported peak weekly flow of 0.480 MGD. See addendum for a discussion of dissolved based limits for copper.

Recent changes to chs. NR 102 and 106 include new temperature criteria and related procedures for calculating water quality based effluent limitations for temperature. These rule changes became effective on October 1st, 2010. Since the discharge is initially to a wetland, thermal criteria are based on the narrative language in ch. NR 103 (s. NR 106.55(4)). Based on the monitoring data submitted by the permittee no temperature limits are recommended at this time. The temperature data indicate that the current discharge is thermally protective of a limited forage fishery; these temperatures will be protective of the wetland functional values. Temperature monitoring is recommended for the 4<sup>th</sup> year of the permit term, grab monitoring coincident with dissolved oxygen monitoring should provide sufficient information.

Recent changes to chs. NR 102 and 217 include new phosphorus criteria and related procedures for calculating water quality based effluent limitations for phosphorus. These rule changes became effective on December 1<sup>st</sup>, 2010. As noted above, the discharge is initially to a wetland, and phosphorus criteria do not apply to wetlands. However the receiving stream classification is limited forage fish at the I-94 culvert where a phosphorus criterion of 0.075 mg/L applies. A site visit was conducted on October 15, 2012. Water travels from the outfall mostly via a sheet flow through the wetland, following a roughly 1,100 ft. path till it reaches the I-94 culvert (see attached map). No flow was observed entering the wetland from upstream locations, and flow was leaving the wetland via the culvert, with some limited channelization leading to the culvert through the wetland. Grab samples were taken at the outfall and at the I-94 culvert. The effluent phosphorus sample was 5.4 mg/L and the sample at the I-94 culvert was 0.98 mg/L. Based on coincident chloride results and conductivity measurements, it appears likely that this change in phosphorus may be more related to attenuation of phosphorus in the wetland system rather than dilution.

Because under low-flow conditions the stream downstream of the wetland is effluent dominated, and data is not available to the Department to demonstrate that a different limit would ensure compliance with the downstream water quality criteria, it is recommended that the water-quality based effluent limit be set equal to the limited forage fish criterion (s. NR 217.13(7)).

For the reasons explained in the April 30, 2012 paper entitled *Justification for Use of Monthly, Growing Season and Annual Average Periods for Expression of WPDES Permit Limits for Phosphorus Discharges in Wisconsin*, WDNR has determined that it is impracticable to express the phosphorus WQBEL for the permittee as maximum daily, weekly, or monthly values. The final effluent limit for phosphorus is expressed as a six-month average (0.075 mg/L). It is also expressed as a monthly average equal to three times the derived WQBEL (0.225 mg/L). This final effluent limit was derived from and complies with the applicable water quality criterion.

Effluent phosphorus data were collected as part of the permit application process. Those data indicate that the 30-day P99 effluent concentration was 5.7 mg/L (n = 12), well above the calculated water quality based limitation, therefore a limit is warranted per s. NR 217.15(1). The calculated water-quality based limitation is stringent enough that a compliance schedule is appropriate. The limited amount of phosphorus data from this facility uncertainly over the quantity of phosphorus attenuated in the wetland indicates that a narrative interim phosphorus limit is appropriate. It is recommended that the permit contain language similar to the following (along with appropriate phosphorus monitoring): “The plant shall be operated in accordance with the optimization plan such that the amount of phosphorus being discharged on an annual basis does not increase over the permit term.”

Based on the data collected during the current and previous permit terms, the stream classification, and the guidance provided in the 2008 *Whole Effluent Toxicity Program Guidance Document - Revision #8*, no Whole Effluent Toxicity (WET) testing is recommended for inclusion in the reissued permit.

If there are any questions or comments, please contact Pat Oldenburg at (715) 831-3262 or via e-mail at [Patrick.Oldenburg@wisconsin.gov](mailto:Patrick.Oldenburg@wisconsin.gov).

e-cc: Tom Ponty - Eau Claire  
Mark Hazuga - Eau Claire  
Diane Figiel – WT/3  
Amanda Minks – WT/3

**Effluent limit calculations for:** Elk Mound Municipal Water and Sewer Utility  
 WPDES Permit #: 0023914  
 Permit Drafter: Holly Heldstab  
 Basin Engineer: Tom Ponty - Eau Claire  
 WQ Reviewer: Mark Hazuga - Eau Claire  
**Receiving Water Information:**  
 Receiving Water: a Wetland Tributary to Muddy Creek  
 Watershed: Muddy and Elk Creek Watershed  
 Basin: Lower Chippewa River Basin  
 County: Dunn  
 Classification: Limited Forage Fish Community, Non-public Water Supply

Flows	7Q10	7Q2	90Q10	Estimated Harmonic Mean	Basin Area (mi 2)
	0	0		0.0	

% Used For Mixing	=	25		
Hardness	=	100	PPM	Same as effluent hardness

Background Metals Data Source: NA since the 7Q10 = 0

Substance	Result
Cadmium	
Chromium	
Copper	
Lead	
Mercury	
Zinc	

Effluent Information:		Daily Average Flow
Outfall Number	f	(mgd) (cfs)
001	0	0.0192 0.03
<b>Σ</b>	0	0.0192 0.03

Effluent Hardness	=	100	PPM
Effluent Dilution due to ZID	=		NA
7Q10:Qe	=	0.0	:1

### CALCULATION OF EFFLUENT LIMITATIONS BASED ON ATC (ug/L)

SUBSTANCE	Ref. Hard. or pH	ATC	Daily Effl. Limit	1/5 of Effl. Limit	Mean Effl. Conc.	1-day P99	1-day Max. Conc.
Chlorine		19.03	38.06	7.61			
Arsenic		339.80	679.60	135.92	1.3		
Cadmium	100	10.31	20.62	4.12	<3		
Chromium (+3)	100	1803.05	3606.10	721.22	<6		
Copper	100	15.52	31.04		18.1	36.1	36
Lead	100	106.92	213.84	42.77	<1		
Nickel	100	455.54	911.08	182.22	8		
Zinc	100	120.38	240.76	48.15	46		
Chloride (mg/L)		757	1514.00		54.3	61.6	58

### CALCULATION OF EFFLUENT LIMITATIONS BASED ON CTC (ug/L)

Receiving Water Flow = 0 cfs

SUBSTANCE	Ref. Hard. or pH	CTC	Mean Back- ground	Weekly Effl. Limit	1/5 of Effl. Limit	Mean Effl. Conc.	4-day P99	4-day Max. Conc.
Chlorine		7.28		7.28	1.46			
Arsenic		152.20		152.20	30.44	1.30		
Cadmium	100	2.46	0.000	2.46	0.49	<3		
Chromium (+3)	100	132.11	0.000	132.11	26.42	<6		
Copper	100	10.35	0.000	10.35		18.1	26.0	
Lead	100	28.01	0.000	28.01	5.60	<1		
Nickel	100	52.19		52.19	10.44	8.00		
Zinc	100	120.38	0.000	120.38	24.08	46.0		
Chloride (mg/L)		395		395.00		54.3	57.815	

### CALCULATION OF EFFLUENT LIMITATIONS BASED ON HTC (ug/L)

Receiving Water Flow = 0.00 cfs

SUBSTANCE	Ref. Hard. or pH	HTC	Mean Back- ground	Monthly Effl. Limit	1/5 of Effl. Limit	Mean Effl. Conc.	30- day P99	30-day Max. Conc.
Cadmium		370	0	370	74	<3		
Chromium (+3)		3.82E+06	0	3.82E+06	7.64E+05	<6		
Lead		140	0	140	28	<1		
Nickel		4.30E+04		4.30E+04	8.60E+03	8.00		

### CALCULATION OF EFFLUENT LIMITATIONS BASED ON HCC (ug/L)

Receiving Water Flow = 0.00 cfs

SUBSTANCE	Ref. Hard. or pH	HCC	Mean Back- ground	Monthly Effl. Limit	1/5 of Effl. Limit	Mean Effl. Conc.	30- day P99	30-day Max. Conc.
Arsenic		13.3		13	3	1.30		

### WHOLE EFFLUENT TOXICITY (WET) TESTING CHECKLIST SUMMARY

	Acute	Chronic
IWC	Not Applicable for Acute	Instream Waste Concentration : 0 (< 35% = 0 pts; 36 - 65% = 1- pts; >65% = 15 pts) <b>Total Points: 0</b>
Historical Data	Acute RPF : 0 a limit is required if $\geq 0.3$ <b>Total Points: 5</b>	Chronic RPF : 0 a limit is required if $\geq 0.3$ <b>Total Points: 0</b>
Effluent Variability	Points assessed for effluent variability, permit violations and WWTP operations <b>Total Points: 0</b>	Same as Acute <b>Total Points: 0</b>
Stream Classification	Points assessed due to receiving water classification <b>0</b>	Same as Acute <b>Total Points: 0</b>
Chemical Specific Data	Acute WQBEL required: 1 Substances detected without WQBEL: 4 Additional compounds of concern: 0 <b>Total Points: 8</b>	Chronic WQBEL required: 0 Substances detected without WQBEL: 0 Additional compounds of concern: 0 <b>Total Points: 0</b>
Additives	# Biocide(s): 0 # Water Quality Conditioners: 0 <b>Total Points: 0</b>	Same as Acute <b>Total Points: 0</b>
Discharge Category	# of industrial contributor(s): 0 <b>Total Points: 0</b>	Same as Acute <b>Total Points: 0</b>
Wastewater Treatment	Points assessed for effluent variability, permit violations and WWTP operations <b>Total Points: 0</b>	Same as Acute <b>Total Points: 0</b>
Downstream Impacts	Points assessed due to ecological impacts solely or partially due to the discharge <b>Total Points: 0</b>	Same as Acute <b>Total Points: 0</b>
<b>TOTAL POINTS</b>	<b>Acute : 13</b>	<b>Chronic : 0</b>

Facility Type:	Municipal
Secondary values considered and no WET data?	N
Is this facility classified as either a Major Municipal or Primarily Industrial Facility?	N
Effluent limits based on a dissolved water quality criterion?	N
Acute Frequency:	No WET tests needed
Chronic Frequency:	NA
Recommended Chronic Dilution Series:	NA
NEW IWC:	NA

Date	Cu (µg/L)	Date	Cu (µg/L)	Date	Cu (µg/L)	Date	Cu (µg/L)
05-Aug-08	18	06-Oct-09	20	07-Dec-10	13	07-Feb-12	22
02-Sep-08	22	03-Nov-09	17	05-Jan-11	21	06-Mar-12	30
07-Oct-08	17	01-Dec-09	21	01-Feb-11	19	28-Mar-12	15
04-Nov-08	12	05-Jan-10	20	01-Mar-11	17	03-Apr-12	12
02-Dec-08	26	02-Feb-10	20	05-Apr-11	8	01-May-12	18
06-Jan-09	36	02-Mar-10	21	03-May-11	12	05-Jun-12	16
04-Feb-09	24	06-Apr-10	14	07-Jun-11	18	03-Jul-12	22
03-Mar-09	21	04-May-10	16	05-Jul-11	8	07-Aug-12	26
07-Apr-09	16	15-Jun-10	18	02-Aug-11	12	04-Sep-12	25
05-May-09	5	06-Jul-10	16	06-Sep-11	15	03-Oct-12	16
02-Jun-09	11	03-Aug-10	14	04-Oct-11	16	06-Nov-12	28
14-Jul-09	18	07-Sep-10	11	01-Nov-11	23	02-Dec-12	20
04-Aug-09	24	05-Oct-10	9	07-Dec-11	17	02-Jan-13	27
01-Sep-09	19	02-Nov-10	11	03-Jan-12	22		

Date	Effluent Total Phosphorous (mg/L)	Monthly Average Effluent Flow Rate (MGD)	Phosphorous Discharged (lb./month)
25-Sep-12	5.66	0.0512	73
02-Oct-12	5.92		
09-Oct-12	5.65		
16-Oct-12	5.25		
23-Oct-12	5.05		
31-Oct-12	7.43	0.0452	84
06-Nov-12	4.08		
13-Nov-12	5.03		
19-Nov-12	3.94		
27-Nov-12	5	0.0535	67
04-Dec-12	5.09		
11-Dec-12	5.15	0.0525	68

Date	Hardness (mg/L as CaCO <sub>3</sub> )	Date	Cl- (mg/L)
25-Sep-12	102	25-Sep-12	58
02-Oct-12	97	02-Oct-12	55
09-Oct-12	100	09-Oct-12	51
16-Oct-12	102	16-Oct-12	53



## Elk Mound WWTP and Wetland



## Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

<b>Facility:</b>	Elk Mound	<b>Data Range</b>	<b>7Q10 or 4Q3:</b>	0	cfs
<b>Outfall(s):</b>	001	<b>Start:</b>	08/01/08	<b>Dilution:</b>	25%
<b>Date Prepared:</b>	26-Feb-13	<b>End:</b>	01/31/13	<b>f:</b>	0
<b>Design Flow (Qe):</b>	0.019	mgd	<b>Stream type:</b>	Limited forage fish community ▼	
			<b>Qs:Qe ratio:</b>	0.0 :1	
			<b>Calculation Needed?</b>	YES	

Month	Water Quality Criteria			Receiving Water Flow Rate (Qs) (cfs)	Representative Highest Effluent Flow Rate (Qe)		Representative Highest Monthly Effluent Temperature		99th Percentile of Representative Data		Calculated Effluent Limits	
	Ta (default)	Sub-Lethal WQC	Acute WQC		7-day Rolling Ave (Qesl)	Daily Max Flow Rate (Qea)	Weekly Ave	Daily Max	Weekly Ave	Daily Max*	Weekly Ave Limit	Daily Max Limit
	(°F)	(°F)	(°F)		(mgd)	(mgd)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)
JAN	37	54	78	0.00	0.060	0.066	37	38	36	41	54	78
FEB	39	54	79	0.00	0.057	0.067					54	79
MAR	43	57	80	0.00	0.243	0.293					57	80
APR	50	63	81	0.00	0.288	0.309					63	81
MAY	59	70	84	0.00	0.174	0.205	59	62	60	63	70	84
JUN	64	77	85	0.00	0.134	0.167	66	68	66	68	77	85
JUL	69	81	86	0.00	0.153	0.199	72	74	72	74	81	86
AUG	68	79	86	0.00	0.194	0.234	69	75	72	77	79	86
SEP	63	73	85	0.00	0.308	0.405	70	72	68	75	73	85
OCT	55	63	83	0.00	0.222	0.317	56	61	58	64	63	83
NOV	46	54	80	0.00	0.090	0.120	49	49	49	54	54	80
DEC	40	54	79	0.00	0.066	0.074	47	49	45	50	54	79

\*NA - Indicates that there are greater than 100 daily maximum values, therefore 99th percentile would be a value less than the recorded daily maximum.

**Addendum:  
Evaluation of Dissolved-Based Metal Limits for  
Elk Mound**

Dissolved-based limits may be evaluated for Elk Mound pursuant to the 1997 revisions to chs. NR 105 and 106. It should be noted that the permittee has not formally requested the evaluation of dissolved-based limits, which normally triggers the consideration of such according to s. NR 106.06(7)(b). Since this request has not been submitted, the dissolved-based limits shall be provided for informational purposes in this document with an explanation of the additional data which the permittee would need to submit to demonstrate that the dissolved-based recommendations belong in the permit.

Information required for the calculation of dissolved-based limits includes the conversion factors from ss. NR 105.05 (5) (for acute criteria) or NR 105.06 (8) (for chronic criteria). Background data is also required to translate the dissolved criteria into a site specific number (the “translator”) from which a total recoverable limit may be calculated based on the fraction of the discharged metal which would be dissolved in the receiving water. To perform this translation the following background data is required:

$$\text{Translator} = \frac{M_{\text{tr}}}{M_{\text{d}}}$$

Where:

$M_{\text{d}}$ : Dissolved metals concentration in the receiving water ( $\mu\text{g/L}$ )

$M_{\text{Tr}}$ : Total Recoverable metals concentration in the receiving water ( $\mu\text{g/L}$ )

Unfortunately, there is not this type of metals data available for the receiving water. However there are data from a nearby site at Baldwin. There are data on total recoverable and dissolved copper such that a translator may be estimated at the site:

Date	Total Recoverable Copper ( $\mu\text{g/L}$ )	Dissolved Copper ( $\mu\text{g/L}$ )	Translator
7-Oct-99	11.2	7.93	1.41
7-Jun-01	7.33	4.08	1.80
7-Jun-02	6.09, 6.16	3.33, 3.54	1.78
		Mean	1.66

Multiplying the translator times the conversion factor from ch. NR 105 times the applicable criterion will give an indication of the amount of “relief” potentially available to the recommended permit limits if the dissolved fraction is considered from the available data:

**Daily Maximum Limit:**

Translated Criteria = NR 105 Criterion \* Conversion Factor \* Translator

$$\text{Copper} = 15.52 \frac{\mu\text{g}}{\text{L}} * 0.960 * 1.66 = 24.73 \frac{\mu\text{g}}{\text{L}}$$

Effluent limits calculated based on the translated criteria are as follows:

$$\text{Daily Maximum Limit: } 2 * \text{ATC} = 2 * 6.25 = 49.46 \mu\text{g/L}$$

Using the dissolved-based approach for copper limits, the daily maximum limit is 49  $\mu\text{g/L}$  (rounded to two significant digits). The total recoverable daily maximum limit is 31  $\mu\text{g/L}$ . Based on the best available data, the 1-day P99 is less than the dissolved based limit. Therefore a daily maximum limit would not be required in the reissued permit if the dissolved based approach were used.

**Weekly Average Limit:**

$$\text{Translated Criteria} = \text{NR 105 Criterion} * \text{Conversion Factor} * \text{Translator}$$

$$\text{Copper} = 10.35 \frac{\mu\text{g}}{\text{L}} * 0.960 * 1.66 = 16.49 \frac{\mu\text{g}}{\text{L}}$$

As there is no dilution at the site, the limit would be 16  $\mu\text{g/L}$  (rounded), which is equal to the criterion. Based on the best available data, the 4-day P99 would still be greater than the dissolved based limit. Therefore a weekly average limit would be required in the reissued permit if the dissolved based approach were used. The recommended weekly average limit would be 16  $\mu\text{g/L}$  and 0.026 lbs/day. The alternate wet weather weekly average limit would be 0.041 lbs/day.

The permittee has the opportunity to collect on-site information to support either the estimated dissolved-based criteria or some alternate criteria. The following monitoring would be recommended for copper at or the outfall:

1. At least two rounds of monitoring of total suspended solids and both total recoverable and filterable metals (copper) in the receiving water would be needed. This information would be used to further verify a site-specific translator for each metal. The monitoring (grab sampling) should take place at a point downstream that is representative of the wetland, where chemical equilibrium has been reached (e.g. ponded area in wetland downstream of outfall).
2. Whole effluent toxicity testing is suggested as part of the dissolved-based metals limit process. In this case annual acute whole effluent testing would be required where no tests are currently required.

**CORRESPONDENCE / MEMORANDUM****State of Wisconsin**

DATE: 13 September 2017

TO: Holly Heldstab – Eau Claire

FROM: Pat Oldenburg - Eau Claire

SUBJECT: Water Quality-Based Effluent Limitations for the Elk Mound Municipal Water and Sewer Utility (WI-0023914)

This is in response to your request for an evaluation of water quality-based effluent limitations for toxic substances using chs. NR 102, 104, 105, 106, 205 and 217 of the Wisconsin Administrative Code (where applicable), for the Elk Mound Municipal Water and Sewer Utility's discharge to a Wetland Tributary to Muddy Creek. The discharge is located in the Muddy and Elk Creek Watershed of the Lower Chippewa River Basin in Dunn County.

Based on our review, the following recommendations are made on a chemical-specific basis:

Parameter	Limit Type	Limit and Units	Notes
Flow Rate		MGD	1
BOD <sub>5</sub> , Total	Daily Max	30 mg/L	1
BOD <sub>5</sub> , Total	Monthly Avg	15 mg/L	1
Suspended Solids, Total	Daily Max	30 mg/L	1
Suspended Solids, Total	Monthly Avg	20 mg/L	1
pH Field	Daily Max	9.0 su	1
pH Field	Daily Min	6.0 su	1
Dissolved Oxygen	Daily Min	4.0 mg/L	1
Nitrogen, Ammonia (NH <sub>3</sub> -N) Total	Monthly Avg	12 mg/L	1,2
Nitrogen, Ammonia (NH <sub>3</sub> -N) Total	Weekly Avg	31 mg/L	1,2
Nitrogen, Ammonia (NH <sub>3</sub> -N) Total	Monthly Avg	3.2 mg/L	1,3
Nitrogen, Ammonia (NH <sub>3</sub> -N) Total	Weekly Avg	8.1 mg/L	1,3
Nitrogen, Ammonia (NH <sub>3</sub> -N) Total	Monthly Avg	2.2 mg/L	1,4
Nitrogen, Ammonia (NH <sub>3</sub> -N) Total	Weekly Avg	5.6 mg/L	1,4
Copper, Total Recoverable	Daily Max	16 µg/L; 0.066 lbs/day	
Copper, Total Recoverable	Weekly Avg	10 µg/L; 0.017 lbs/day	5
Copper, Total Recoverable	Monthly Avg	10 µg/L	
Zinc, Total Recoverable	Daily Max	120 µg/L; 0.51 lbs/day	
Zinc, Total Recoverable	Weekly Avg	120 µg/L	
Zinc, Total Recoverable	Monthly Avg	120 µg/L	
Phosphorus, Total	Monthly Avg	0.225 mg/L	
Phosphorus, Total	6 Month Avg	0.075 mg/L; 0.12 lbs/day	
Acute WET			6

1. Continued from current permit.
2. Limit effective October – March.
3. Limit effective April – May.
4. Limit effective June – September.
5. The alternate wet weather weekly average limitation for copper is 0.041 lbs/day.

6. Two tests in permit term.

Recent updates to chapters NR 106 and 205 of the Wis. Admin. Code require that whenever practicable, effluent limitations be expressed as weekly average and monthly average limitations for continuously discharging publicly owned treatment works.

Zinc: The 1-day P99 of the effluent zinc data exceeds the calculated daily maximum zinc limitation, therefore a daily maximum zinc limit is warranted. The daily maximum limitations are 120 µg/L and 0.51 lbs/day (rounded). The mass limitation is based on the concentration limit and the estimated maximum day design flow of 0.510 MGD.

As noted above, recent updates to chapters NR 106 and 205 of the Wis. Admin. Code require that, whenever practicable, effluent limitations be expressed as weekly average and monthly average limitations for continuously discharging publicly owned treatment works. It is recommended that the weekly average and monthly average zinc limitations be set equal to the daily maximum limitation of 120 µg/L.

Copper: Daily maximum copper limits are recommended at Elk Mound since the 1-day P99 value and the daily maximum reported concentration exceeds the calculated daily maximum limitation. The calculated daily maximum limitations are 16 µg/L and 0.066 lbs/day. The mass limitation is based on the concentration limit and the estimated maximum day design flow of 0.510 MGD. Weekly average copper limits are recommended at Elk Mound since the 4-day P99 value exceeds the calculated weekly average limitation. The calculated weekly average limitations are 10 µg/L and 0.017 lbs/day. The mass limitation is based on the concentration limit and the average design flow of 0.192 MGD. The alternate wet weather weekly average mass limitation of 0.041 lbs/day is based on the reported peak weekly flow of 0.480 MGD. See addendum for a discussion of dissolved based limits for copper.

As noted above, recent updates to chapters NR 106 and 205 of the Wis. Admin. Code require that, whenever practicable, effluent limitations be expressed as weekly average and monthly average limitations for continuously discharging publicly owned treatment works. It is recommended that the monthly average copper limitations be set equal to the weekly average concentration limitation of 10 µg/L.

Temperature: Chapters NR 102 and 106 include temperature criteria and related procedures for calculating water quality based effluent limitations for temperature. Since the discharge is initially to a wetland, thermal criteria are based on the narrative language in ch. NR 103 (s. NR 106.55(4)). Based on the monitoring data submitted by the permittee no temperature limits are recommended at this time. The temperature data indicate that the current discharge will be protective of the wetland functional values. While the end-of-pipe temperatures exceeded the limited forage fish criteria during the month of November, the effluent will cool off considerably in the wetland and the discharge will not thermally impact the downstream limited forage fishery. Given the current amount of temperature data available, no routine temperature monitoring is recommended for inclusion in the reissued permit.

Phosphorus: Chapters NR 102 and 217 include phosphorus criteria and related procedures for

calculating water quality based effluent limitations for phosphorus. As noted above, the discharge is initially to a wetland, and phosphorus criteria do not apply to wetlands. However, the receiving stream classification is limited forage fish at the I-94 culvert where a phosphorus criterion of 0.075 mg/L applies. A site visit was conducted on October 15, 2012. Water travels from the outfall mostly via a sheet flow through the wetland, following a roughly 1,100 ft. path till it reaches the I-94 culvert (see attached map). No flow was observed entering the wetland from upstream locations, and flow was leaving the wetland via the culvert, with some limited channelization leading to the culvert through the wetland. Grab samples were taken at the outfall and at the I-94 culvert. The effluent phosphorus sample was 5.4 mg/L and the sample at the I-94 culvert was 0.98 mg/L. Based on coincident chloride results and conductivity measurements, it appears likely that this change in phosphorus may be more related to attenuation of phosphorus in the wetland system rather than dilution.

Because under low-flow conditions the stream downstream of the wetland is effluent dominated, and data is not available to the Department to demonstrate that a different limit would ensure compliance with the downstream water quality criteria, it is recommended that the water-quality based effluent limit be set equal to the limited forage fish criterion (s. NR 217.13(7)).

For the reasons explained in the April 30, 2012 paper entitled *Justification for Use of Monthly, Growing Season and Annual Average Periods for Expression of WPDES Permit Limits for Phosphorus Discharges in Wisconsin*, WDNR has determined that it is impracticable to express the phosphorus WQBEL for the permittee as maximum daily, weekly, or monthly values. The final effluent limit for phosphorus is expressed as a six-month average (0.075 mg/L). It is also expressed as a monthly average equal to three times the derived WQBEL (0.225 mg/L). This final effluent limit was derived from and complies with the applicable water quality criterion. As downstream waterbodies are on Wisconsin's 303(d) list for phosphorus impairments, a mass limit is required per s. NR 217.14. The recommended mass limit is 0.12 lbs/day 6-month average and is based on the corresponding concentration limit and the design flow of 0.192 MGD.

Effluent phosphorus data were collected as part of the permit application process. Those data indicate that the 30-day P99 effluent concentration was 5.7 mg/L (n = 12), well above the calculated water quality based limitation, therefore a limit is warranted per s. NR 217.15(1). The calculated water-quality based limitation is stringent enough that a compliance schedule is appropriate. Given the limited amount of phosphorus data from this facility it is recommended that the monthly average interim limit be set at 7.7 mg/L (equivalent to the 1-day P99 of the effluent data).

Whole Effluent Toxicity: Based on Chapter 1.3 of the November 1, 2016 *Whole Effluent Toxicity Program Guidance Document - Revision #11*, two acute WET tests are recommended primarily because of lack of recent data and known copper issues. No chronic WET tests are recommended during the permit term, due to the nature of the immediate receiving water (wetland). For additional whole effluent toxicity information, please consult the WET checklist in SWAMP and the attached summary table.

If there are any questions or comments, please contact Pat Oldenburg at (715) 831-3262 or via e-mail at [Patrick.Oldenburg@wisconsin.gov](mailto:Patrick.Oldenburg@wisconsin.gov).

e-cc: Ben Hartenbower - Eau Claire  
Mark Hazuga - Eau Claire  
Diane Figiel – WQ/3



**Effluent limit calculations for:** Elk Mound Municipal Water and Sewer Utility  
 WPDES Permit #: 0023914  
 Permit Drafter: Holly Heldstab  
 Basin Engineer: Ben Hartenbower - Eau Claire  
 WQ Reviewer: Mark Hazuga - Eau Claire  
**Receiving Water Information:**  
 Receiving Water: a Wetland Tributary to Muddy Creek  
 Watershed: Muddy and Elk Creek Watershed  
 Basin: Lower Chippewa River Basin  
 County: Dunn  
 Classification: Limited Aquatic Community, Non-public Water Supply

Flows	7Q10	7Q2	90Q10	Estimated Harmonic Mean	Basin Area (mi <sup>2</sup> )
	0	0	0	0	

% Used For Mixing	=	25		
Hardness	=	100	PPM	Same as effluent hardness

Background Metals Data Source: NA since 7Q10=0

Substance	Result
Cadmium	
Chromium	
Copper	
Lead	
Zinc	

Effluent Information:		Daily Average Flow
Outfall Number	f	(mgd) (cfs)
001		0.192 0.30
<b>Σ</b>	0	0.192 0.30

Effluent Hardness	=	100	PPM
Effluent Dilution due to ZID	=		NA
7Q10:Qe	=	0.0	:1

**CALCULATION OF EFFLUENT LIMITATIONS BASED ON ATC (ug/L)**

SUBSTANCE	Ref. Hard. or pH	ATC	Daily Effl. Limit	1/5 of Effl. Limit	Mean Effl. Conc.	1- day P99	1-day Max. Conc.
Chlorine		19.03	19.03	3.81			
Arsenic		339.80	339.80	67.96	1.3		
Cadmium	100	10.31	10.31	2.06	<3		
Chromium (+3)	100	1803.05	1803.05	360.61	<6		
Copper	100	15.52	15.52		16.3	40.0	42
Lead	100	106.92	106.92	21.38	<1		
Nickel	100	455.54	455.54	91.11	8.0		
Zinc	100	120.38	120.38		49.4	147.2	99
Chloride (mg/L)		757	757.00		54		58

**CALCULATION OF EFFLUENT LIMITATIONS BASED ON CTC (ug/L)**

Receiving Water Flow = 0 cfs

SUBSTANCE	Ref. Hard. or pH	CTC	Mean Back- ground	Weekly Effl. Limit	1/5 of Effl. Limit	Mean Effl. Conc.	4- day P99	4-day Max. Conc.
Chlorine		7.28		7.28	1.46			
Arsenic		152.20		152.20	30.44	1.30		
Cadmium	100	2.46		2.46	0.49	<3		
Chromium (+3)	100	132.11		132.11	26.42	<6		
Copper	100	10.35		10.35		16.3	26.5	
Lead	100	28.01		28.01	5.60	<1		
Nickel	100	73.43		73.43	14.69	8.0		
Zinc	100	120.38		120.38		49.4	90.9	
Chloride (mg/L)		395		395.00		54.3		

**CALCULATION OF EFFLUENT LIMITATIONS BASED ON HTC (ug/L)**

Receiving Water Flow = 0.00 cfs

SUBSTANCE	Ref. Hard. or pH	HTC	Mean Back- ground	Monthly Effl. Limit	1/5 of Effl. Limit	Mean Effl. Conc.	30- day P99	30- day Max. Conc.
Cadmium		880		880	176	<3		
Chromium (+3)		8.40E+06		8.40E+06	1.68E+06	<6		
Lead		2.24E+03		2.24E+03	448	<1		
Nickel		1.10E+05		1.10E+05	2.20E+04	8.0		

**CALCULATION OF EFFLUENT LIMITATIONS BASED ON HCC (ug/L)**

Receiving Water Flow = 0.00 cfs

SUBSTANCE	Ref. Hard. or pH	HCC	Mean Back- ground	Monthly Effl. Limit	1/5 of Effl. Limit	Mean Effl. Conc.	30- day P99	30- day Max. Conc.
Arsenic		40		40	8	1.30		

Date	Hardness (mg/L as CaCO <sub>3</sub> )	Date	Cl- (mg/L)	Date	Zn (µg/L)	Date	Zn (µg/L)
25-Sep-12	102	25-Sep-12	58	25-Sep-12	46	09-Jul-13	21
02-Oct-12	97	02-Oct-12	55	18-Jun-13	38	12-Jul-13	77
09-Oct-12	100	09-Oct-12	51	21-Jun-13	99	16-Jul-13	54
16-Oct-12	102	16-Oct-12	53	25-Jun-13	11	19-Jul-13	60
				01-Jul-13	16	23-Jul-13	41
				05-Jul-13	80		

Date	Cu (µg/L)	Date	Cu (µg/L)	Date	Cu (µg/L)	Date	Cu (µg/L)
05-Aug-14	16	05-May-15	14	01-Mar-16	25	06-Dec-16	16
02-Sep-14	14	02-Jun-15	7	17-Mar-16	14	10-Jan-17	28
07-Oct-14	11	07-Jul-15	19	05-Apr-16	10	24-Jan-17	16
04-Nov-14	18	04-Aug-15	20	03-May-16	11	07-Feb-17	14
02-Dec-14	23	03-Sep-15	21	07-Jun-16	9	07-Mar-17	12
06-Jan-15	26	08-Oct-15	18	05-Jul-16	17	06-Apr-17	13
03-Feb-15	23	03-Nov-15	18	02-Aug-16	19	02-May-17	8
03-Mar-15	42	01-Dec-15	15	06-Sep-16	10	06-Jun-17	9
26-Mar-15	14	05-Jan-16	14	04-Oct-16	10	11-Jul-17	9
09-Apr-15	9	02-Feb-16	32	01-Nov-16	11		

Date	Effluent Total Phosphorous (mg/L)	Monthly Average Effluent Flow Rate (MGD)	Phosphorous Discharged (lb./month)
25-Sep-12	5.66	0.0512	73
02-Oct-12	5.92		
09-Oct-12	5.65		
16-Oct-12	5.25		
23-Oct-12	5.05		
31-Oct-12	7.43	0.0452	84
06-Nov-12	4.08		
13-Nov-12	5.03		
19-Nov-12	3.94		
27-Nov-12	5	0.0535	67
04-Dec-12	5.09		
11-Dec-12	5.15	0.0525	68

### WHOLE EFFLUENT TOXICITY (WET) TESTING CHECKLIST SUMMARY

	Acute	Chronic
IWC	Not Applicable for Acute	Not recommended due to nature of receiving water
Historical Data	# detects used to calculate RP: 0 # tests failed: 0 Acute RP: 0 a limit is required if >1.0	
Effluent Variability	Points assessed for effluent variability, permit violations and WWTP operations <b>Total Points: 5</b>	
Stream Classification	Points assessed due to receiving water classification <b>Total Points: 0</b>	
Chemical Specific Data	Acute WQBEL required: 2 Substances detected without WQBEL: 3 Additional compounds of concern: 0 <b>Total Points: 9</b>	
Additives	# Biocide(s): 0 # Water Quality Conditioners: 0 SorbX-100 or other novel chemicals: N <b>Total Points: 0</b>	
Discharge Category	# of industrial contributor(s): 0 <b>Total Points: 0</b>	
Wastewater Treatment	Points assessed due to type of wastewater treatment present <b>Total Points: 0</b>	
Downstream Impacts	Points assessed due to ecological impacts solely or partially due to the discharge <b>Total Points: 0</b>	
<b>TOTAL POINTS</b>	<b>Acute : 19</b>	

Facility Type:	Municipal
Secondary values considered and no WET data?	No
Is this facility classified as a Major Municipal Facility?	No
Effluent limits based on a dissolved water quality criterion?	No
Acute frequency based on points:	2 tests in permit term
Chronic frequency based on points:	NA
Minimum acute frequency due to # failures and RP:	NA
Minimum chronic frequency due to # failures and RP:	NA
Chronic Dilution Series:	NA
Recommended Acute Frequency:	2 tests in permit term
Recommended Chronic Frequency:	NA
Acute limit required?	No
Chronic limit required?	No
Acute Limit:	1.0
Chronic Limit:	NA
Acute TRE Recommended?	NA
Chronic TRE Recommended?	NA

### Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

<b>Facility:</b>	Elk Mound	<b>Data Range</b>	<b>7Q10 or 4Q3:</b> 0 cfs
<b>Outfall(s):</b>	002	<b>Start:</b>	01/01/12
<b>Date Prepared:</b>	31-Aug-17	<b>End:</b>	07/31/17
<b>Design Flow (Qe):</b>	0.192	mgd	
		<b>Stream type:</b>	Limited forage fish community ▼
		<b>Qs:Qe ratio:</b>	0.0 :1
		<b>Calculation Needed?</b>	YES

Month	Water Quality Criteria			Receiving Water Flow Rate (Qs) (cfs)	Representative Highest Effluent Flow Rate (Qe)		Representative Highest Monthly Effluent Temperature		99th Percentile of Representative Data		Calculated Effluent Limits	
	Ta (default)	Sub-Lethal WQC	Acute WQC		7-day Rolling Ave (Qesl)	Daily Max Flow Rate (Qea)	Weekly Ave	Daily Max	Weekly Ave	Daily Max*	Weekly Ave Limit	Daily Max Limit
	(°F)	(°F)	(°F)		(mgd)	(mgd)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)
JAN	37	54	78	0.00	0.093	0.100	37	38	33	41	54	78
FEB	39	54	79	0.00	0.155	0.183	37	41	36	44	54	79
MAR	43	57	80	0.00	0.186	0.253	36	40	35	43	57	80
APR	50	63	81	0.00	0.267	0.356	38	51	42	54	63	81
MAY	59	70	84	0.00	0.310	0.384	59	62	55	NA	70	84
JUN	64	77	85	0.00	0.373	0.900	66	68	60	NA	77	85
JUL	69	81	86	0.00	0.238	0.360	72	74	66	NA	81	86
AUG	68	79	86	0.00	0.088	0.106	71	75	68	NA	79	86
SEP	63	73	85	0.00	0.181	0.254	70	72	66	71	73	85
OCT	55	63	83	0.00	0.092	0.104	58	61	59	NA	63	83
NOV	46	54	80	0.00	0.131	0.164	56	59	54	62	54	80
DEC	40	54	79	0.00	0.164	0.196	51	53	47	NA	54	79

\*NA - Indicates that there are greater than 100 daily maximum values, therefore 99th percentile would be a value less than the recorded daily maximum.

## Elk Mound WWTP and Wetland



**Addendum:  
Evaluation of Dissolved-Based Metal Limits for  
Elk Mound  
13 September 2017**

Dissolved-based limits may be evaluated for Elk Mound pursuant to the 1997 revisions to chs. NR 105 and 106. It should be noted that the permittee has not formally requested the evaluation of dissolved-based limits, which normally triggers the consideration of such according to s. NR 106.06(7)(b). Since this request has not been submitted, the dissolved-based limits shall be provided for informational purposes in this document with an explanation of the additional data which the permittee would need to submit to demonstrate that the dissolved-based recommendations belong in the permit.

Information required for the calculation of dissolved-based limits includes the conversion factors from ss. NR 105.05 (5) (for acute criteria) or NR 105.06 (8) (for chronic criteria). Background data is also required to translate the dissolved criteria into a site specific number (the “translator”) from which a total recoverable limit may be calculated based on the fraction of the discharged metal which would be dissolved in the receiving water. To perform this translation the following background data is required:

$$\text{Translator} = \frac{M_{tr}}{M_d}$$

Where:

$M_d$ : Dissolved metals concentration in the receiving water ( $\mu\text{g/L}$ )

$M_{Tr}$ : Total Recoverable metals concentration in the receiving water ( $\mu\text{g/L}$ )

Unfortunately, there is not this type of metals data available for the receiving water. However there are data from a nearby site at Baldwin. There are data on total recoverable and dissolved copper such that a translator may be estimated at the site:

Date	Total Recoverable Copper ( $\mu\text{g/L}$ )	Dissolved Copper ( $\mu\text{g/L}$ )	Translator
7-Oct-99	11.2	7.93	1.41
7-Jun-01	7.33	4.08	1.80
7-Jun-02	6.09, 6.16	3.33, 3.54	1.78
		Mean	1.66

Multiplying the translator by the conversion factor from ch. NR 105 times the applicable criterion will give an indication of the amount of “relief” potentially available to the recommended permit limits if the dissolved fraction is considered from the available data:

**Daily Maximum Limit:**

$$\text{TranslatedCriteria} = \text{NR 105 Criterion} * \text{ConversionFactor} * \text{Translator}$$



$$\text{Copper} = 15.52 \frac{\mu\text{g}}{\text{L}} * 0.960 * 1.66 = 24.73 \frac{\mu\text{g}}{\text{L}}$$

Because there is no dilution at the discharge site, the daily maximum limit would equal to the acute toxicity criterion. Using the dissolved-based approach for copper limits, the daily maximum limit is 25 µg/L and 0.11 lbs/day (rounded to two significant digits). The mass limitation is based on the concentration limit and the estimated maximum day design flow of 0.510 MGD. Based on the best available data, the 1-day P99 is greater than the dissolved based limit. Therefore a daily maximum limit would still be required in the reissued permit if the dissolved based approach were used.

#### **Weekly Average Limit:**

$$\text{TranslatedCriteria} = \text{NR 105 Criterion} * \text{ConversionFactor} * \text{Translator}$$

$$\text{Copper} = 10.35 \frac{\mu\text{g}}{\text{L}} * 0.960 * 1.66 = 16.49 \frac{\mu\text{g}}{\text{L}}$$

As there is no dilution at the site, the limit would be 16 µg/L (rounded), which is equal to the criterion. Based on the best available data, the 4-day P99 would still be greater than the dissolved based limit. Therefore a weekly average limit would be required in the reissued permit if the dissolved based approach were used. The recommended weekly average limit would be 16 µg/L and 0.026 lbs/day. The alternate wet weather weekly average limit would be 0.041 lbs/day.

The permittee has the opportunity to collect on-site information to support either the estimated dissolved-based criteria or some alternate criteria. The following monitoring would be recommended for copper at or the outfall:

1. At least two rounds of monitoring of total suspended solids and both total recoverable and filterable metals (copper) in the receiving water would be needed. This information would be used to further verify a site-specific translator for each metal. The monitoring (grab sampling) should take place at a point downstream that is representative of the wetland, where chemical equilibrium has been reached (e.g. ponded area in wetland downstream of outfall).
2. Whole effluent toxicity testing is suggested as part of the dissolved-based metals limit process. In this case annual acute whole effluent testing would be required where two tests are currently recommended.